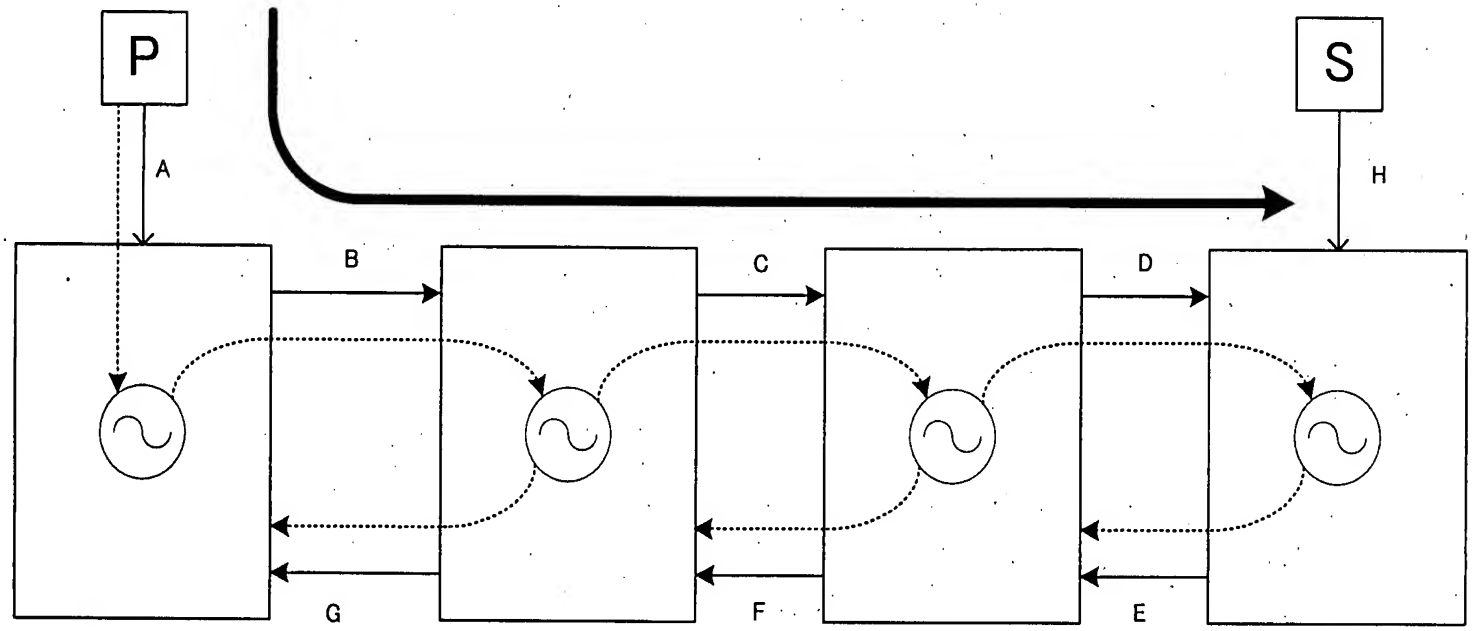
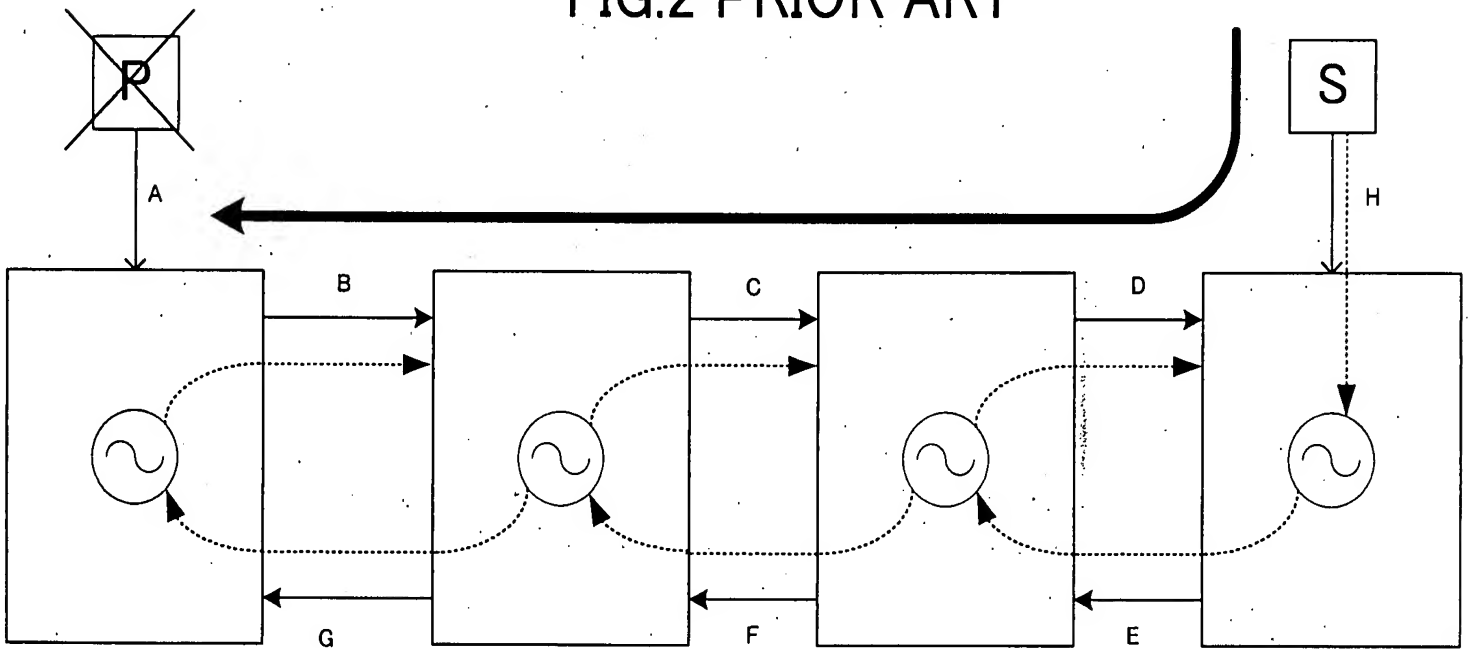
FIG.1 PRIOR ART



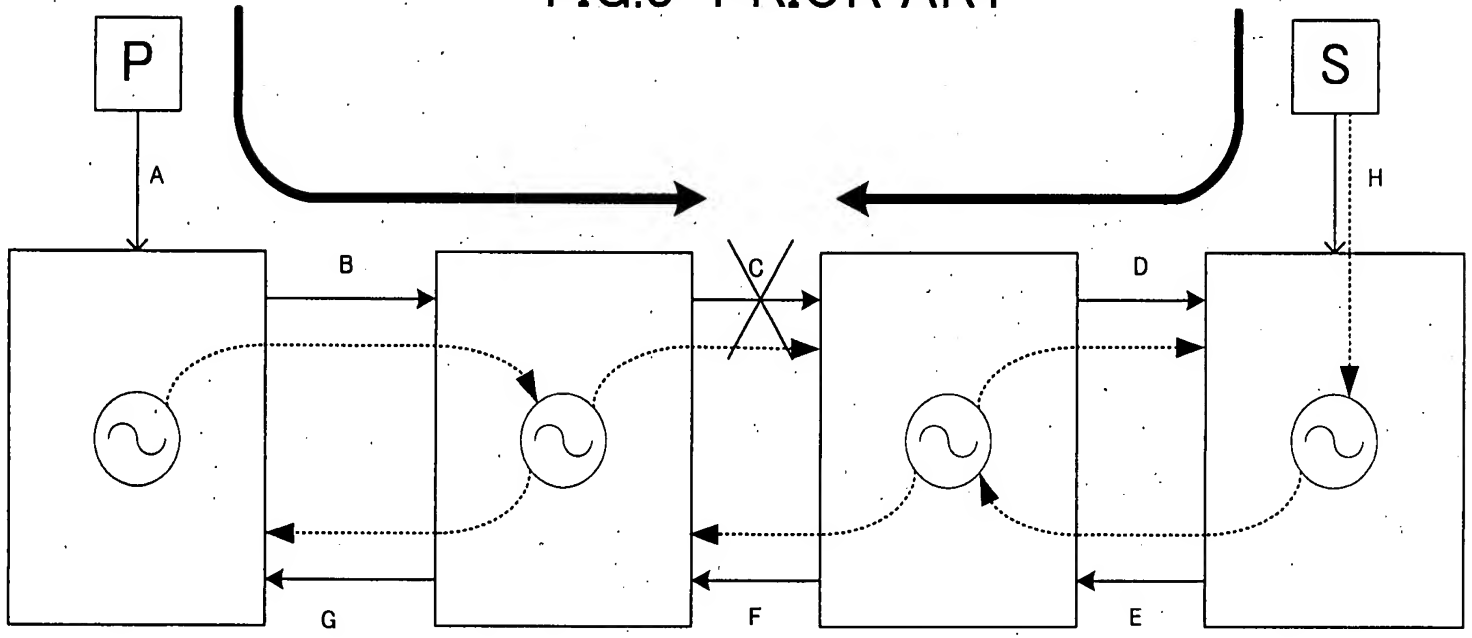
NE1	NE2	NE3	NE4
SETTING: PRIORITY1=EXTERNAL INPUT A PRIORITY2=TRANSMISSION PATH G	SETTING: PRIORITY1=TRANSMISSION PATH B PRIORITY2=TRANSMISSION PATH F	SETTING: PRIORITY1=TRANSMISSION PATH C PRIORITY2=TRANSMISSION PATH E	SETTING: PRIORITY1=TRANSMISSION PATH D PRIORITY2=EXTERNAL INPUT H
CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY1

FIG.2 PRIOR ART



NE1	NE2	NE3	NE4
SETTING: PRIORITY1=EXTERNAL INPUT A PRIORITY2=TRANSMISSION PATH G	SETTING: PRIORITY1=TRANSMISSION PATH B PRIORITY2=TRANSMISSION PATH F	SETTING: PRIORITY1=TRANSMISSION PATH C PRIORITY2=TRANSMISSION PATH E	SETTING: PRIORITY1=TRANSMISSION PATH D PRIORITY2=EXTERNAL INPUT H
CURRENTLY SELECTED TIMING SOURCE: PRIORITY2	CURRENTLY SELECTED TIMING SOURCE: PRIORITY2	CURRENTLY SELECTED TIMING SOURCE: PRIORITY2	CURRENTLY SELECTED TIMING SOURCE: PRIORITY2

FIG.3 PRIOR ART



NE1	NE2	NE3	NE4
SETTING: PRIORITY1=EXTERNAL INPUT A PRIORITY2=TRANSMISSION PATH G	SETTING: PRIORITY1=TRANSMISSION PATH B PRIORITY2=TRANSMISSION PATH F	SETTING: PRIORITY1=TRANSMISSION PATH C PRIORITY2=TRANSMISSION PATH E	SETTING: PRIORITY1=TRANSMISSION PATH D PRIORITY2=EXTERNAL INPUT H
CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY2	CURRENTLY SELECTED TIMING SOURCE: PRIORITY2

FIG.4 PRIOR ART

	S1 BYTE	SDH	SONET
1	0000	QL-INV0	QL-STU
2	0001	QL-INV1	QL-PRS
3	0010	QL-PRC	QL-INV2
4	0011	QL-INV3	QL-INV3
5	0100	QL-SSU-A	QL-TNC
6	0101	QL-INV5	QL-INV5
7	0110	QL-INV6	QL-INV6
8	0111	QL-INV7	QL-ST2
9	1000	QL-SSU-B	QL-INV8
10	1001	QL-INV9	QL-INV9
11	1010	QL-INV10	QL-ST3
12	1011	QL-SEC	QL-INV11
13	1100	QL-INV12	QL-SMC
14	1101	QL-INV13	QL-ST3E
15	1110	QL-INV14	QL-PROV
16	1111	QL-DNU	QL-DUS

1 QL-PRC : Primary Reference Clock
2 QL-SSU-A : Primary Level SSU
3 QL-SSU-B : Second Level SSU
4 QL-SEC : SDH Equipment Clock
5 QL-DNU : Not to be Used for Synchronization
6 QL-INVx : Invalid

1 QL-PRS : Primary Reference Clock
2 QL-STU : Synchronized – Traceability Unknown
3 QL-ST2 : Traceable to Stratum 2
4 QL-TNC : Traceable to Transit Node Clock
5 QL-ST3E : Traceable to Stratum 3E
6 QL-ST3 : Traceable to Stratum 3
7 QL-SMC : Traceable to SONET Clock Self Timed
8 QL-PROV : Provisionable by the Network Operator
9 QL-DNS : Not to be Used for Synchronization
10 QL-INV : Invalid

FIG.5A PRIOR ART

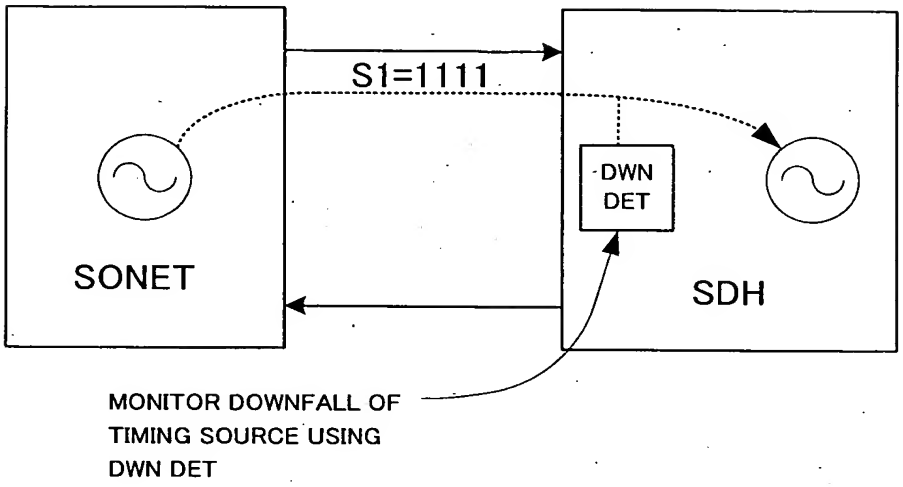


FIG.5B PRIOR ART

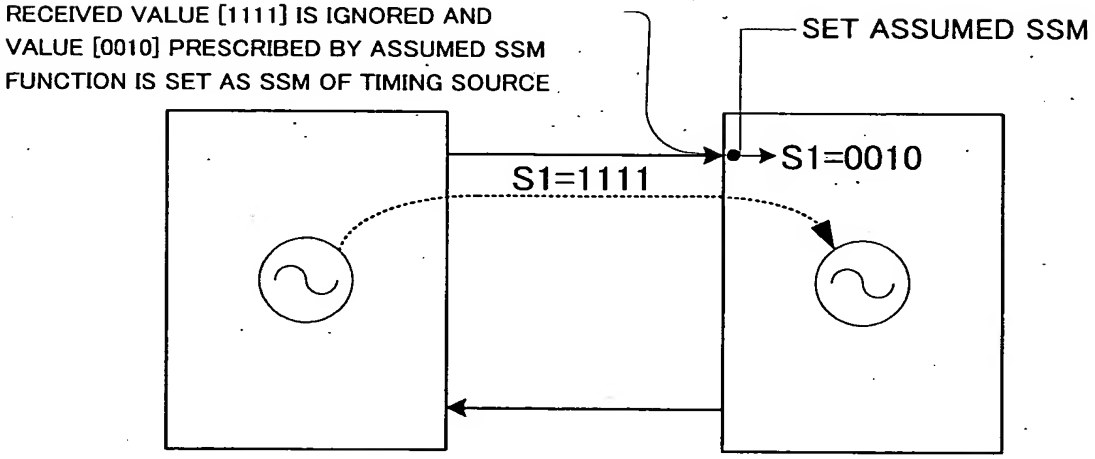
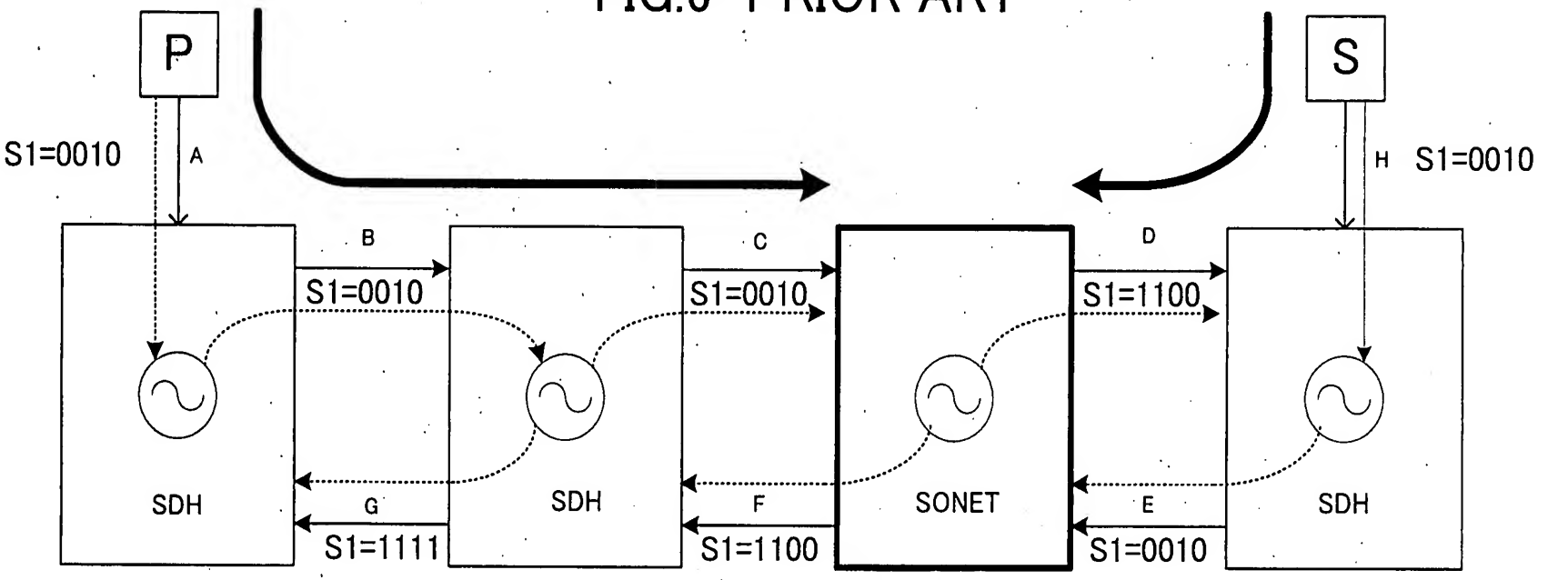


FIG.6 PRIOR ART



NE1

SETTING:
PRIORITY1=EXTERNAL INPUT A
PRIORITY2=TRANSMISSION PATH G

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1

NE2

SETTING:
PRIORITY1=TRANSMISSION PATH B
PRIORITY2=TRANSMISSION PATH F

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1

NE3

SETTING:
PRIORITY1=TRANSMISSION PATH C
PRIORITY2=TRANSMISSION PATH E

CURRENTLY SELECTED TIMING SOURCE:
HOLDOVER OR INTERNAL CLOCK

NE4

SETTING:
PRIORITY1=TRANSMISSION PATH D
PRIORITY2=EXTERNAL INPUT H

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY2

FIG.7

SDH		
QL-LEVEL	QL-VALUE	ORDER
QL-PRC	1	HIGHEST
QL-SSU-A	2	
QL-SSU-B	3	
QL-SEC	4	
QL-DNU	5	
QL-INVx	6	LOWEST

SONET		
QL-LEVEL	QL-VALUE	ORDER
QL-PRS	1	HIGHEST
QL-STU	2	
QL-ST2	3	
QL-TNC	4	
QL-ST3E	5	
QL-ST3	6	
QL-SMC	7	
QL-PROV	DEFAULT	
QL-DUS	9	
QL-INVx	10	LOWEST

FIG.8

SDH/SONET CONVERT

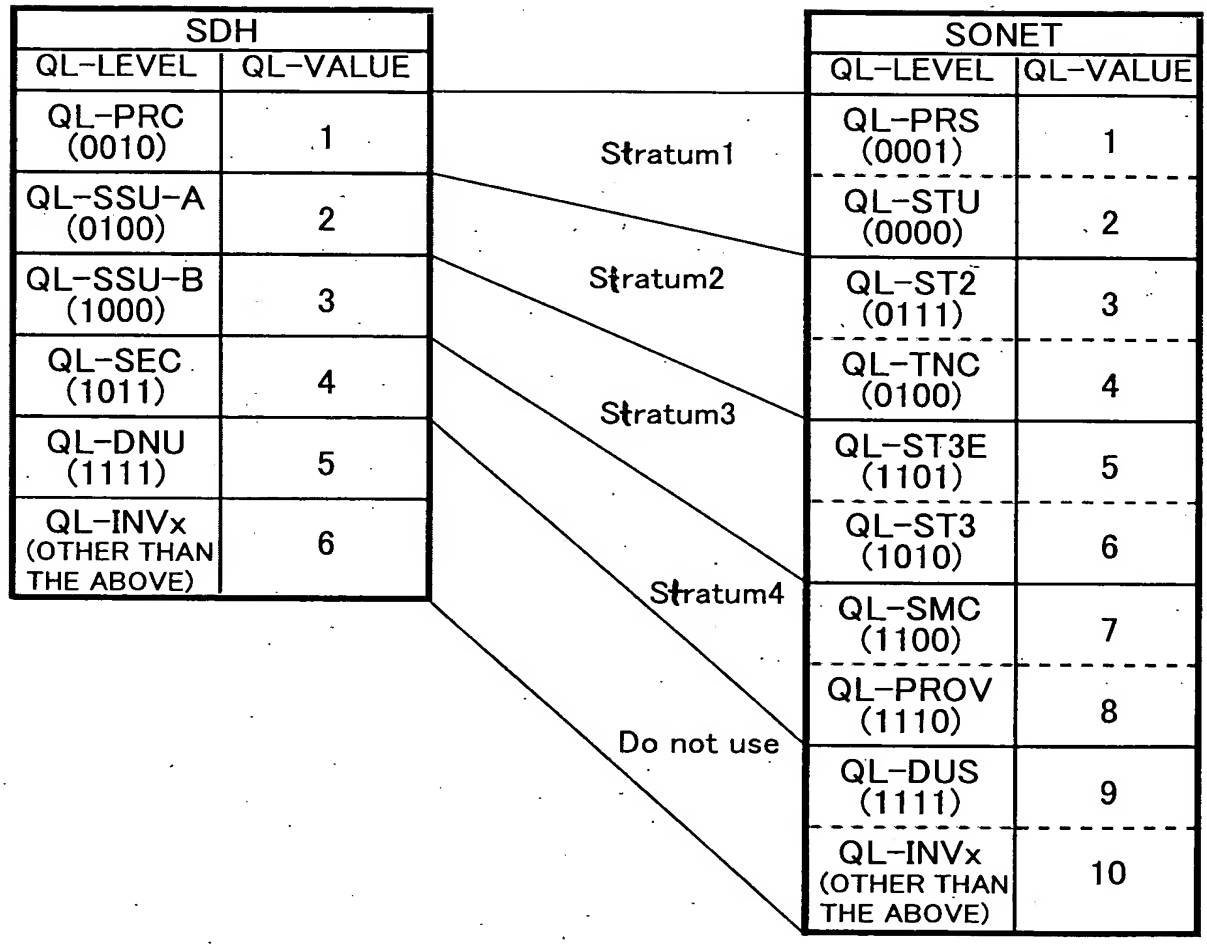


FIG.9

SONET-SDH-SONET

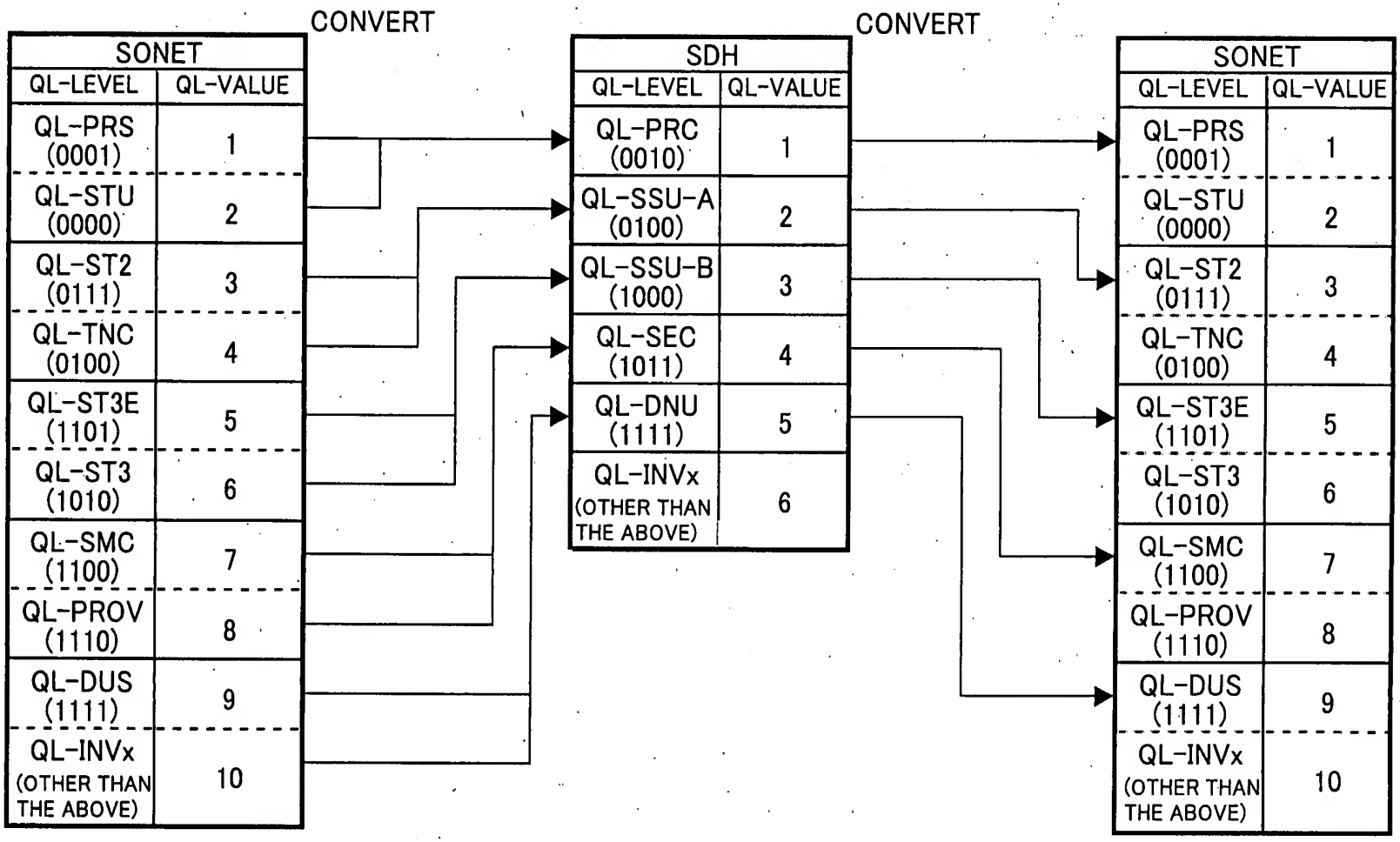


FIG.10

SDH-SONET-SDH

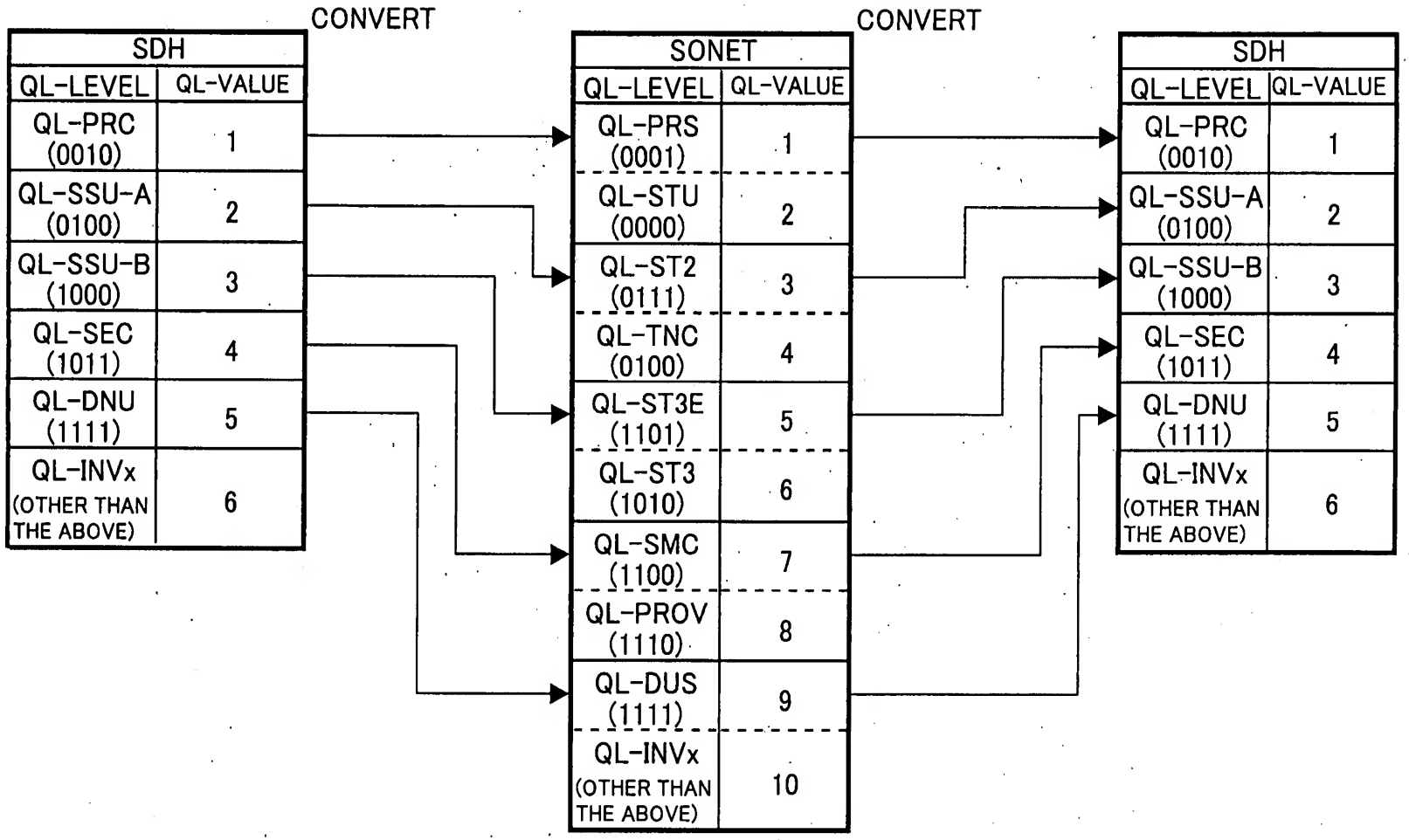
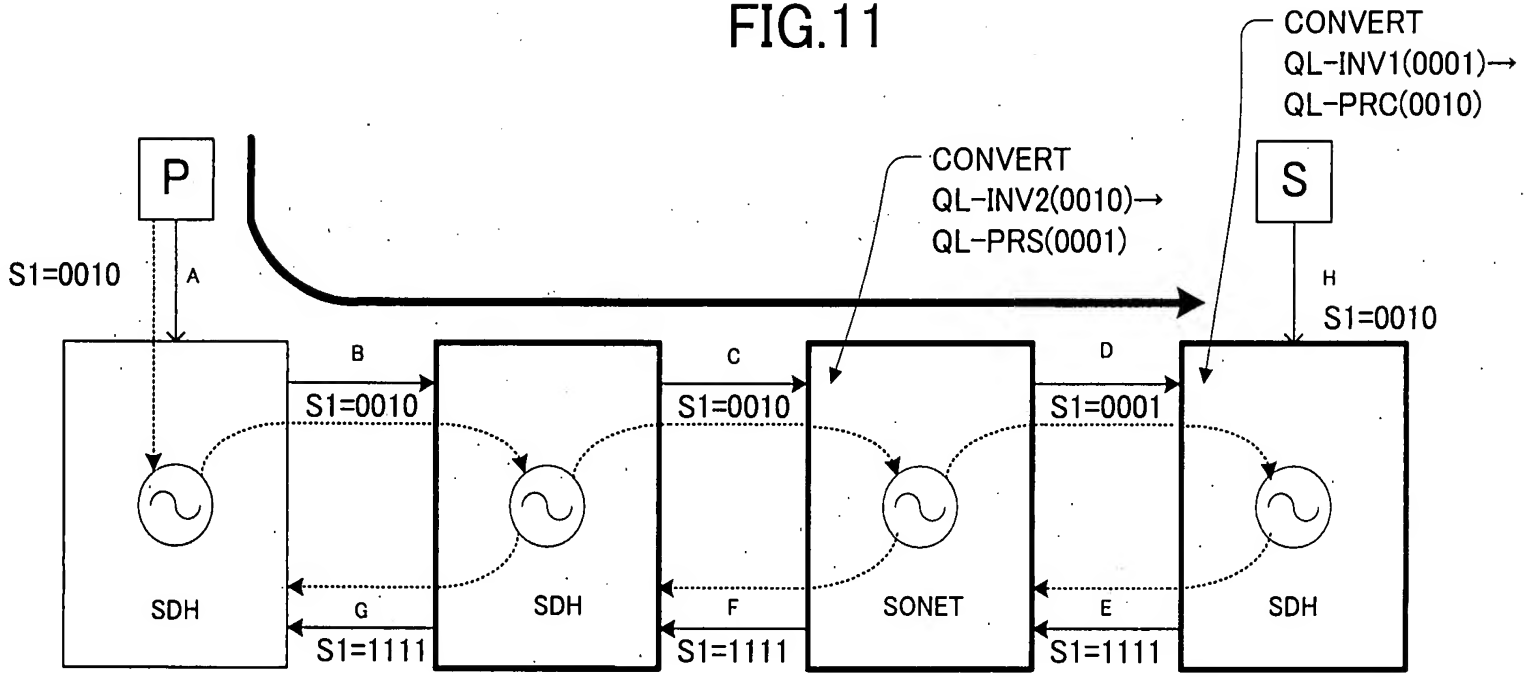
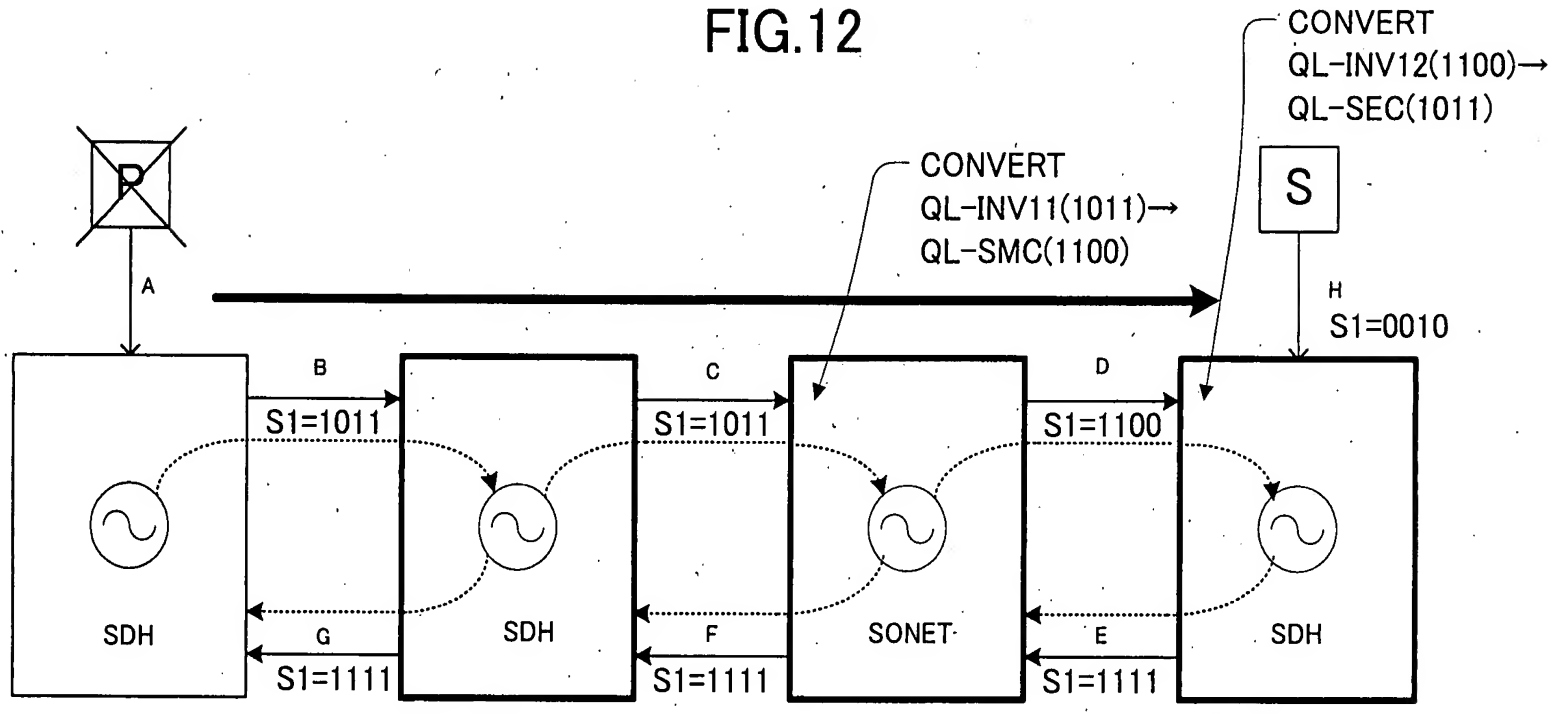


FIG.11



NE1	NE2	NE3	NE4
SETTING: PRIORITY1=EXTERNAL INPUT A PRIORITY2=TRANSMISSION PATH G	SETTING: PRIORITY1=TRANSMISSION PATH B PRIORITY2=TRANSMISSION PATH F	SETTING: PRIORITY1=TRANSMISSION PATH C PRIORITY2=TRANSMISSION PATH E	SETTING: PRIORITY1=TRANSMISSION PATH D PRIORITY2=EXTERNAL INPUT H
CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY1	CURRENTLY SELECTED TIMING SOURCE: PRIORITY1
	HAS CONVERSION FUNCTION	HAS CONVERSION FUNCTION	HAS CONVERSION FUNCTION

FIG.12



NE1

SETTING:
PRIORITY1=EXTERNAL INPUT A
PRIORITY2=TRANSMISSION PATH G

CURRENTLY SELECTED TIMING SOURCE:
HOLDOVER

NE2

SETTING:
PRIORITY1=TRANSMISSION PATH B
PRIORITY2=TRANSMISSION PATH F

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1

HAS CONVERSION FUNCTION

NE3

SETTING:
PRIORITY1=TRANSMISSION PATH C
PRIORITY2=TRANSMISSION PATH E

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1

HAS CONVERSION FUNCTION

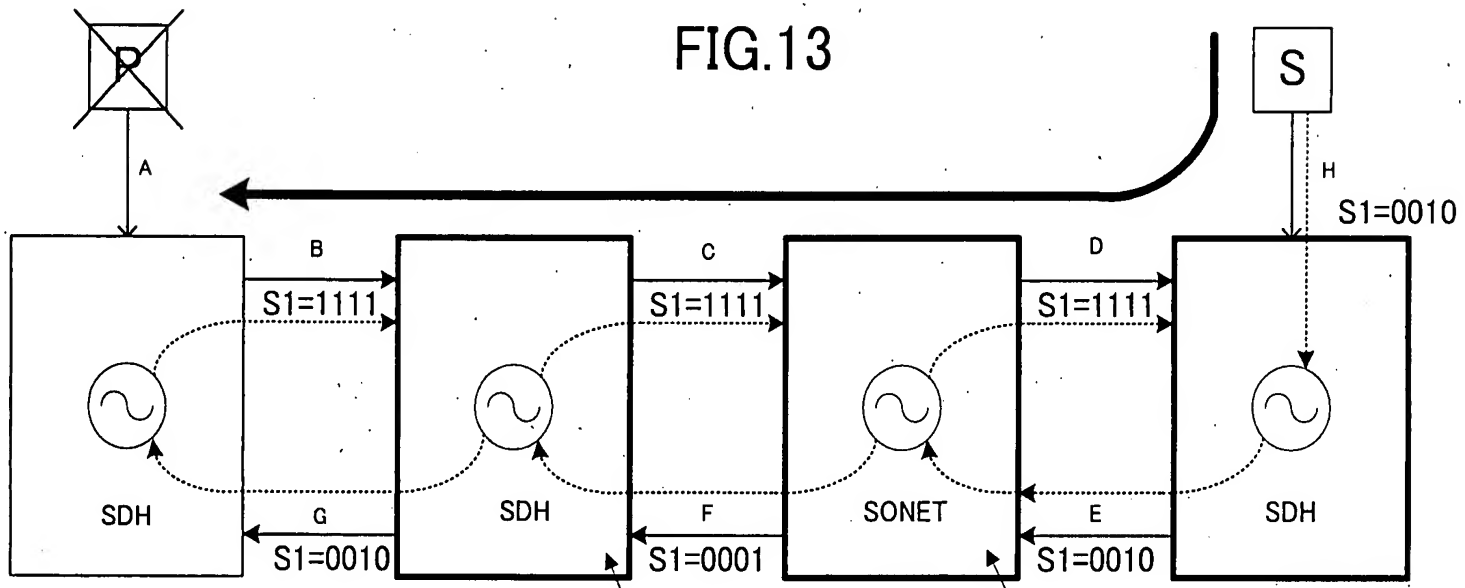
NE4

SETTING:
PRIORITY1=TRANSMISSION PATH D
PRIORITY2=EXTERNAL INPUT H

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY2

HAS CONVERSION FUNCTION

FIG.13



NE1

SETTING:
PRIORITY1=TRANSMISSION PATH A
PRIORITY2=TRANSMISSION PATH G

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY2

NE2

SETTING:
PRIORITY1=TRANSMISSION PATH B
PRIORITY2=TRANSMISSION PATH F

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY2

CONVERT
QL-INV1(0001) → QL-PRC(0010)

HAS CONVERSION FUNCTION

NE3

SETTING:
PRIORITY1=TRANSMISSION PATH C
PRIORITY2=TRANSMISSION PATH E

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY2

HAS CONVERSION FUNCTION

NE4

SETTING:
PRIORITY1=TRANSMISSION PATH D
PRIORITY2=TRANSMISSION PATH H

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY2

CONVERT
QL-INV2(0010) → QL-PRS(0001)

HAS CONVERSION FUNCTION

FIG.14

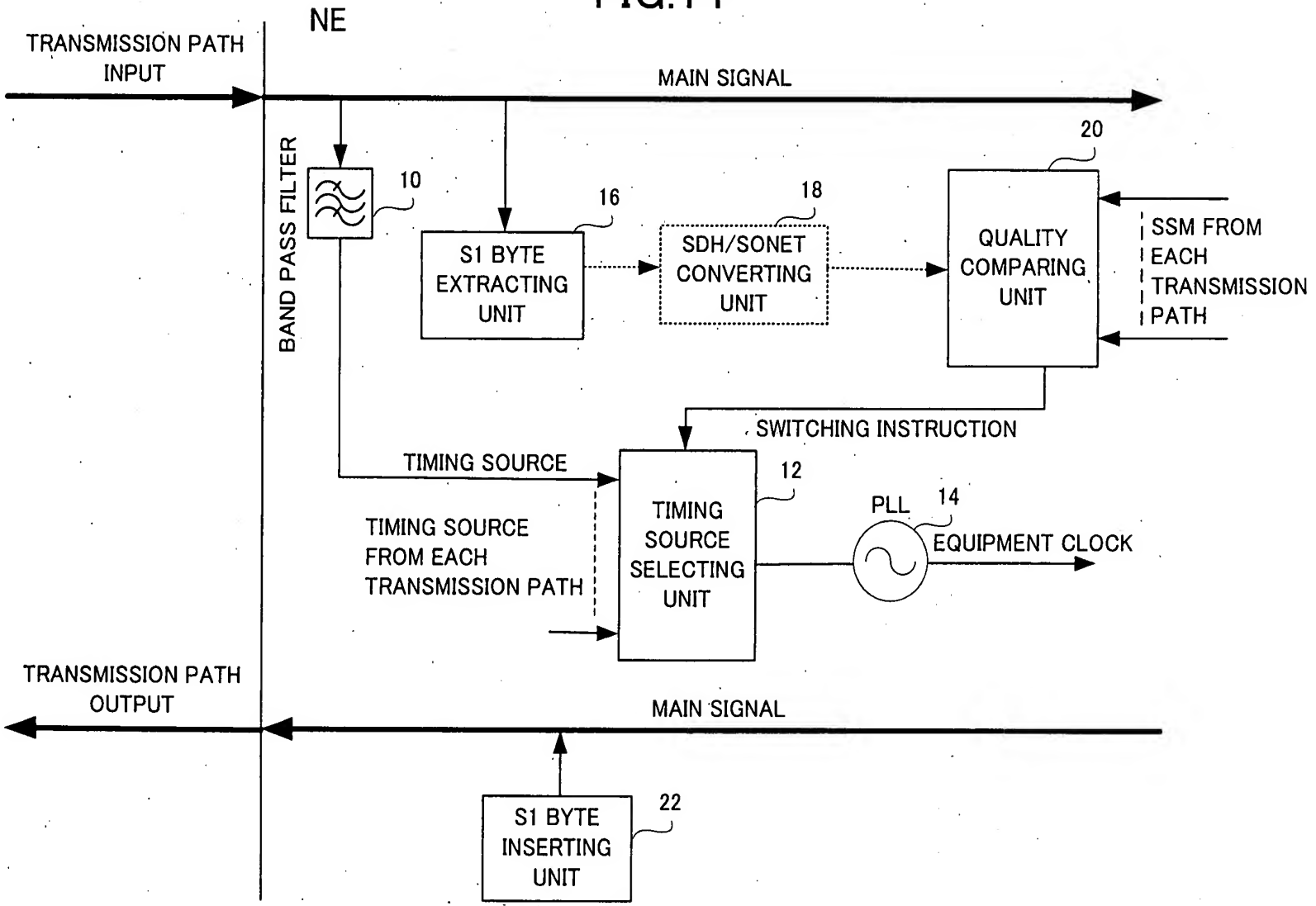

NE
TRANSMISSION PATH INPUT
MAIN SIGNAL
BAND PASS FILTER
10
16
S1 BYTE EXTRACTING UNIT
18
SDH/SONET CONVERTING UNIT
20
QUALITY COMPARING UNIT
SSM FROM EACH TRANSMISSION PATH
SWITCHING INSTRUCTION
TIMING SOURCE
TIMING SOURCE FROM EACH TRANSMISSION PATH
12
TIMING SOURCE SELECTING UNIT
PLL
14
EQUIPMENT CLOCK
TRANSMISSION PATH OUTPUT
MAIN SIGNAL
S1 BYTE INSERTING UNIT
22

FIG.15

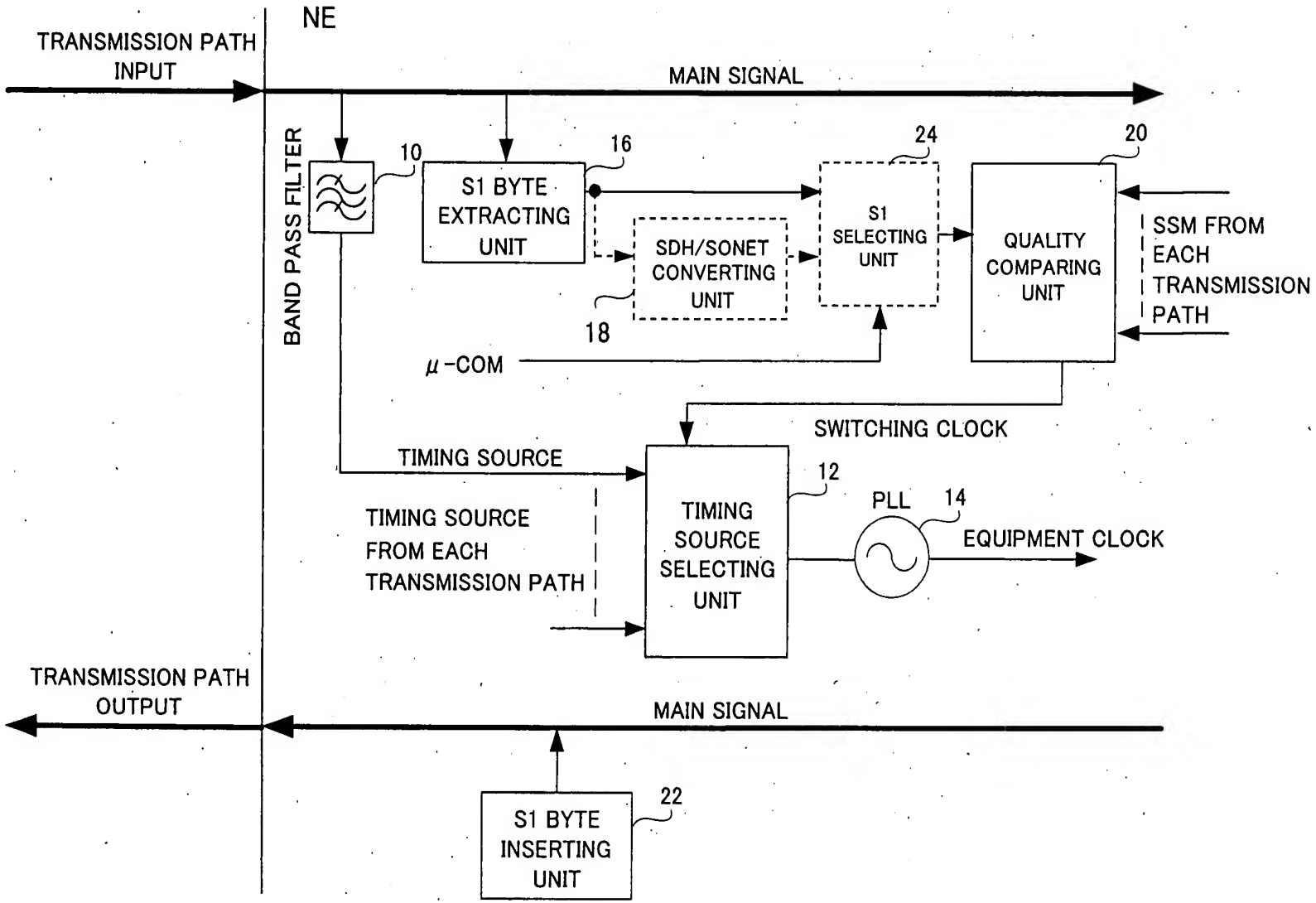

NE
TRANSMISSION PATH INPUT
MAIN SIGNAL
BAND PASS FILTER
10
S1 BYTE EXTRACTING UNIT
16
SDH/SONET CONVERTING UNIT
18
S1 SELECTING UNIT
24
QUALITY COMPARING UNIT
20
SSM FROM EACH TRANSMISSION PATH
μ-COM
SWITCHING CLOCK
TIMING SOURCE
TIMING SOURCE FROM EACH TRANSMISSION PATH
TIMING SOURCE SELECTING UNIT
12
PLL
14
EQUIPMENT CLOCK
TRANSMISSION PATH OUTPUT
MAIN SIGNAL
S1 BYTE INSERTING UNIT
22

FIG.16

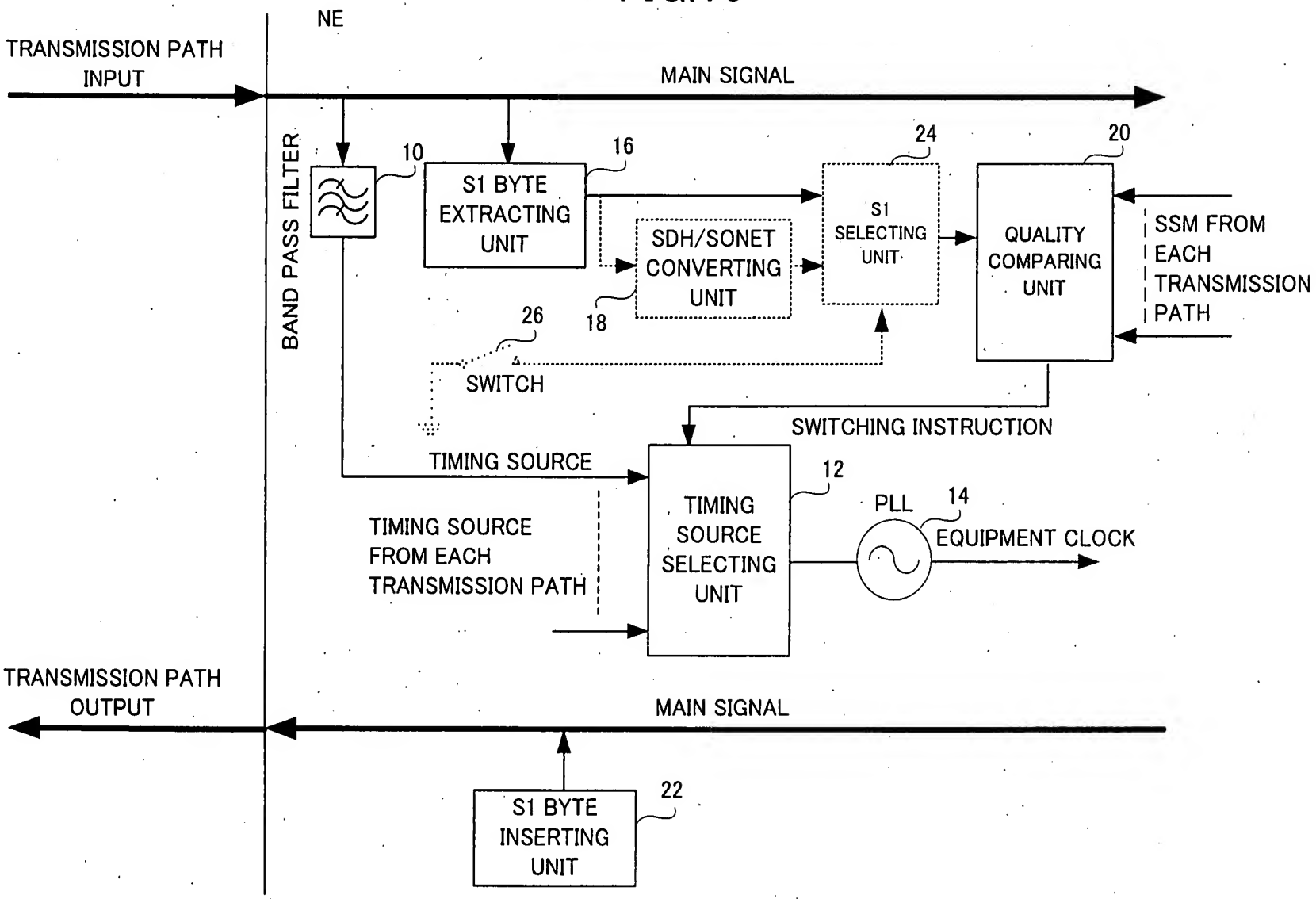

NE
TRANSMISSION PATH INPUT
MAIN SIGNAL
BAND PASS FILTER
10
S1 BYTE EXTRACTING UNIT
16
SDH/SONET CONVERTING UNIT
18
24
S1 SELECTING UNIT
20
QUALITY COMPARING UNIT
SSM FROM EACH TRANSMISSION PATH
26
SWITCH
SWITCHING INSTRUCTION
TIMING SOURCE
TIMING SOURCE FROM EACH TRANSMISSION PATH
12
TIMING SOURCE SELECTING UNIT
PLL
14
EQUIPMENT CLOCK
TRANSMISSION PATH OUTPUT
MAIN SIGNAL
22
S1 BYTE INSERTING UNIT

FIG.17

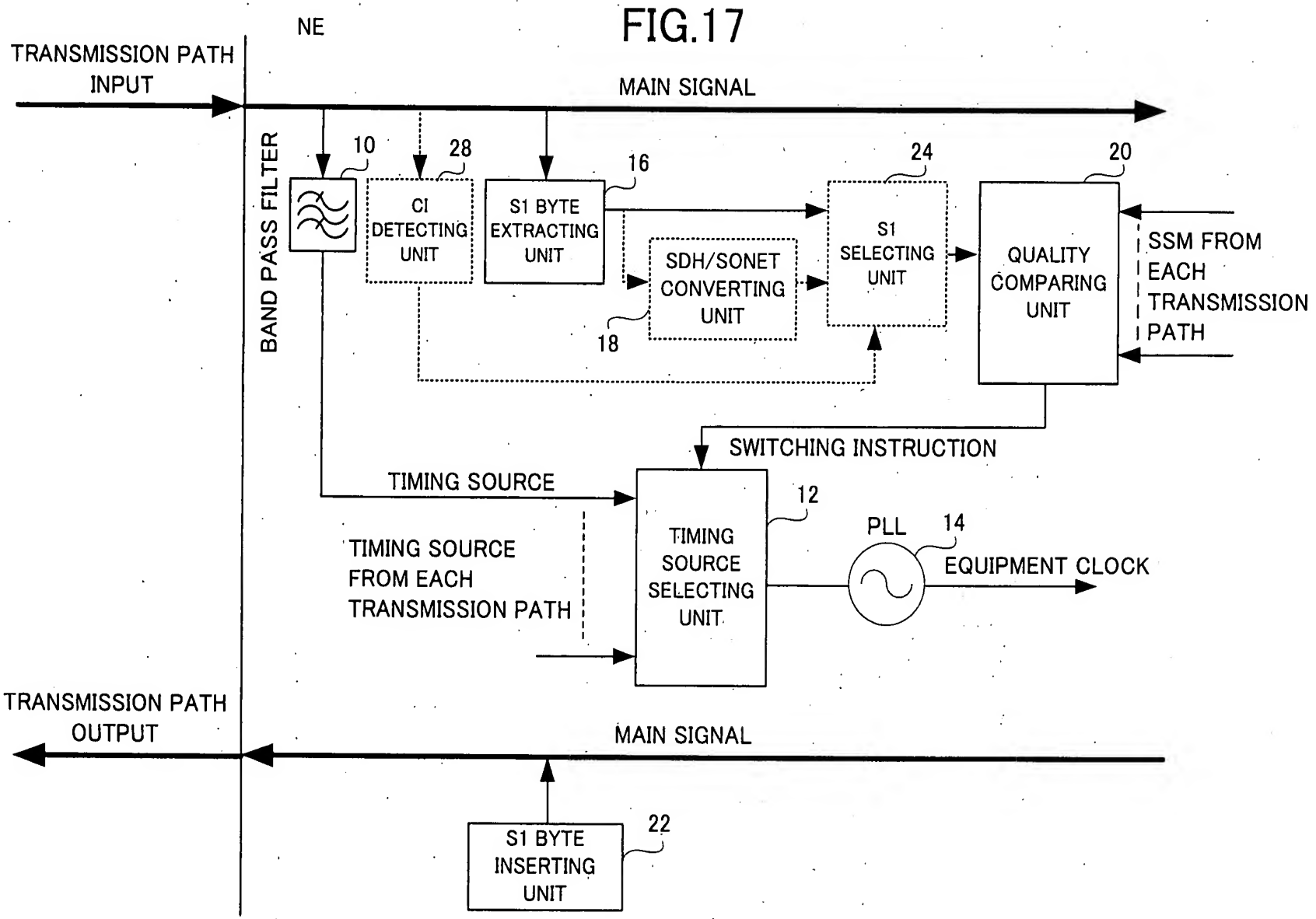

NE
TRANSMISSION PATH INPUT
MAIN SIGNAL
BAND PASS FILTER
10
28
16
24
20
CI DETECTING UNIT
S1 BYTE EXTRACTING UNIT
SDH/SONET CONVERTING UNIT
18
S1 SELECTING UNIT
QUALITY COMPARING UNIT
SSM FROM EACH TRANSMISSION PATH
SWITCHING INSTRUCTION
TIMING SOURCE
TIMING SOURCE FROM EACH TRANSMISSION PATH
12
TIMING SOURCE SELECTING UNIT
PLL
14
EQUIPMENT CLOCK
TRANSMISSION PATH OUTPUT
MAIN SIGNAL
S1 BYTE INSERTING UNIT
22

FIG.18

	SDH APPARATUS	SONET APPARATUS
SDH SIGNAL (WITH CI)	DO NOT CONVERT	CONVERT
SONET SIGNAL (WITHOUT CI)	CONVERT	DO NOT CONVERT

FIG.19A

DEFAULT

SDH → SONET

FROM		TO
0000	→	0000
0001	→	0001
0010	→	0001
0011	→	0011
0100	→	0111
0101	→	0101
0110	→	0110
0111	→	0111
1000	→	1101
1001	→	1001
1010	→	1010
0011	→	1100
1100	→	1100
1101	→	1101
1110	→	1110
1111	→	1111

FIG.19B

CLIENT SETTING

SDH → SONET

FROM		TO	
0000	→	0000	
0001	→	0001	
0010	→	0001	
0011	→	0011	
0100	→	0100	⇒SET QL-SSU-A TO BE CONVERTED TO QL-TNC
0101	→	0101	
0110	→	0110	
0111	→	0111	
1000	→	1010	⇒SET QL-SSU-A TO BE CONVERTED TO QL-TNC
1001	→	1001	
1010	→	1010	
0011	→	1100	
1100	→	1100	
1101	→	1101	
1110	→	1110	
1111	→	1111	

FIG.20

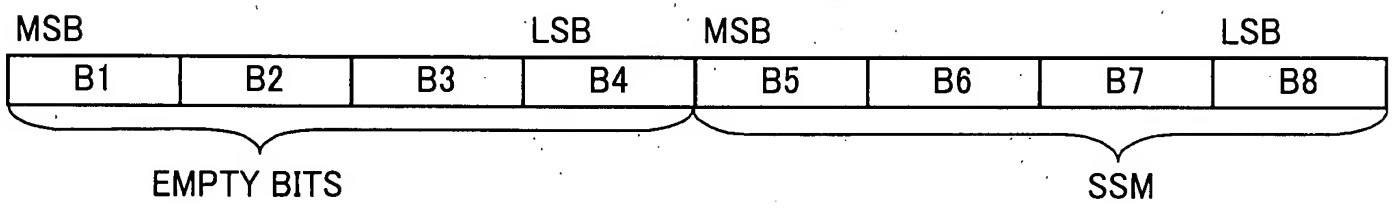
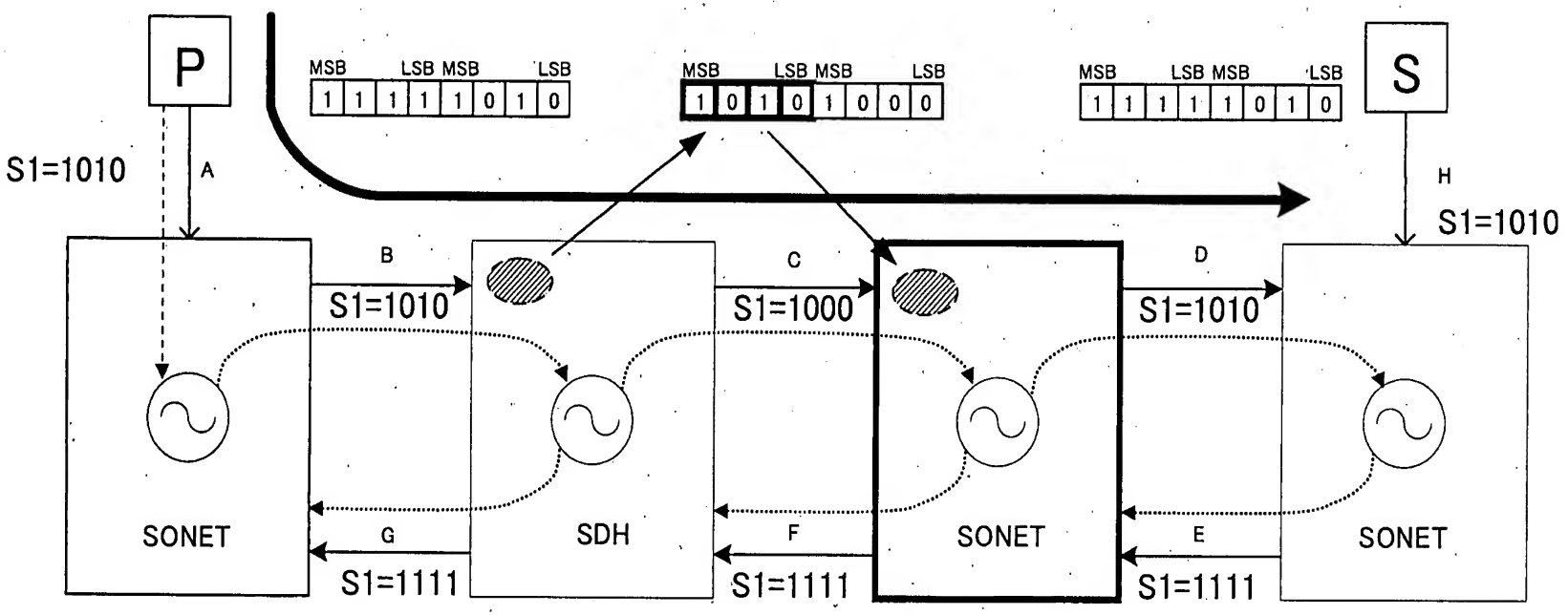


FIG.21



NE1

SETTING:
PRIORITY1=TRANSMISSION PATH A
PRIORITY2=TRANSMISSION PATH G

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1

NE2

SETTING:
PRIORITY1=TRANSMISSION PATH B
PRIORITY2=TRANSMISSION PATH F

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1

NE3

SETTING:
PRIORITY1=TRANSMISSION PATH C
PRIORITY2=TRANSMISSION PATH E

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1

NE4

SETTING:
PRIORITY1=TRANSMISSION PATH D
PRIORITY2=TRANSMISSION PATH H

CURRENTLY SELECTED TIMING SOURCE:
PRIORITY1